

WHAT IS CLAIMED IS:

- 1 1. A process for minimizing energy consumption during the
2 production of polyethylene terephthalate where amorphous pellets are crystallized
3 at elevated temperature and subsequently introduced into a solid state polymerization
4 reactor, comprising
5 removing heat from hot pellets from the solid state polymerization
6 reactor, transferring heat removed to heat cool pellets which constitute a feed to a
7 crystallizer.
- 1 2. The process of claim 1, wherein a heat exchanger is
2 employed, wherein hot pellets exiting a solid state polymerization reactor are
3 introduced into a cooling zone of a first heat exchanger and cool pellets to be
4 introduced into a crystallizer are introduced into a heating zone of a second heat
5 exchanger, heat removed from hot pellets in said first heat exchanger supplied to
6 said second heat exchanger.
- 1 3. The process of claim 2 wherein said first heat exchanger and
2 said second heat exchanger are physically located in one device.
- 1 4. The process of claim 2, wherein said heat exchanger is a
2 direct contact heat exchanger.
- 1 5. The process of claim 2, wherein said heat exchanger is a
2 plate-plate heat exchanger.
- 1 6. The process of claim 2, wherein said heat exchanger is a plate
2 and shell heat exchanger.
- 1 7. The process of claim 2, wherein pellet flow in at least one
2 portion of said heat exchanger is accompanied with a concurrent or countercurrent
3 flow of gas.

1 8. The process of claim 2, wherein said heat exchanger is a
2 remote contact heat exchanger.

1 9. The process of claim 2, wherein said heat exchanger
2 comprises a heating zone located remote from a cooling zone, and heat is transferred
3 from said cooling zone to said heating zone by means of a fluid.

1 10. The process of claim 9, wherein said fluid is a gas which
2 traverses said heating zone and said cooling zone in a closed loop.

1 11. The process of claim 10, wherein cooled pellets are
2 mechanically separated from heated gas in or after a cooling zone and said heated
3 gas entrains cool pellets in or before a heating zone.

1 12. The process of claim 10, wherein said heat exchanger
2 comprises a continuous loop of piping through which said gas is circulated.

1 13. The process of claim 12, wherein said continuous loop of
2 piping has contained therein or is interrupted by at least one pellet separator which
3 separates pellets from flowing gas.

1 14. The process of claim 9, wherein hot pellets are cooled by a
2 stream of gas in a fluidized or agitated bed, and the stream of gas is directed to a
3 further fluidized bed in which cool pellets are heated by said gas.

1 15. The process of claim 14, wherein said stream of gas and said
2 fluidized beds constitute a continuous loop through which said gas is circulated.

1 16. The process of claim 1, wherein a portion of heat removed
2 from pellets exiting the solid state polymerization reactor is used to heat pellets
3 exiting a crystallizer prior to their entry into a solid state polymerization reactor,
4 and a remaining portion of said heat removed is used to heat pellets prior to entry
5 into said crystallizer.